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10/725,397	12/03/2003	Masao Kato	03500.017754.	5019

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EXAMINER	
KAU, STEVEN Y	

ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/725,397	KATO ET AL.	
	Examiner	Art Unit	
	STEVEN KAU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6,7,9,10,12,13,15,16,18 and 25-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6,7,9,10,12,13,15,16,18 and 25-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 17 September 2008 has been entered.

Response to Amendment

2. Applicant's amendment was received on 9/17/2008, and has been entered and made of record.

Claims 2, 5, 8, 11, 14, 17 and 19-24 have been cancelled and currently claims 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18 and 25 to 27 remain pending, of which claims 1, 4, 7, 10, 13, 16, and 25 to 27 are independent.

Response to Remark/Arguments

3. Applicant's arguments with respect to the above claims have been fully considered and the reply to the arguments is presented as follows:

- Applicant's arguments, "Rejection Under 35 U.S.C. § 112", 2nd paragraph, page 12, Remarks, with respect to claims 1, 3, 4, 6, 25, 26 and 27 have been fully considered and are persuasive. The rejection of claims 1, 3, 4, 6, 25, 26 and 27 under 35 U.S.C. § 112 Second Paragraph has been withdrawn.
- Applicant's arguments, "Claim Rejections Under 35 U.S.C. § 103(a)", Pages 12-18, Remarks, with respect to claims 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18 and 25 to 27 have been fully considered but are moot in view of the new ground(s) of rejection.

Claim Objection

4. Claims 1, 7, and 13 are objected to under 37 CFR 1.75 as being a substantial duplicate of claims 4, 10, and 16. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). Claim 1 is directed to an image processing apparatus and claim 4 is directed to a print control apparatus, and these claims have identical features. Comparison of these claims are presented in the table below:

	Claim 1			Claim 4
Preamble	An image processing apparatus for executing an error diffusion process to a plurality of density components, comprising:		Preamble	A print control apparatus for executing an error diffusion process to a plurality of density components, comprising:

A	a processor and a memory;	A	a processor and a memory;
B	a first processing executing unit that executes the error diffusion process by changing at least one of a quantization threshold value and a quantization diffusion coefficient which are used for the error diffusion process on the basis of information on one of the density components to be processed;	B	a first processing executing unit that executes the error diffusion process by changing at least one of a quantization threshold value and a quantization diffusion coefficient which are used for the error diffusion process on the basis of information on one of the density components to be processed;
C	a second processing unit that executes the error diffusion process by setting, into fixed values, the quantization threshold value and the quantization diffusion coefficient which are used for the error diffusion process, wherein the error diffusion process by the second processing unit requires a lighter processing load than the error diffusion process by the first processing unit; and	C	a second processing unit that executes the error diffusion process by setting, into fixed values, the quantization threshold value and the quantization diffusion coefficient which are used for the error diffusion process, wherein the error diffusion process by the second processing unit requires a lighter processing load than the error diffusion process by the first processing unit; and
D	an error diffusion processing control controlling unit that controls to execute, by the first processing unit, the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component whose highest density which can be expressed is low, and executing, by the second processing unit, the error diffusion process to the density component whose highest density which can be expressed is high.	D	an error diffusion processing control unit that controls to execute, by the first processing unit, the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component whose highest density which can be expressed is low, and executing, by the second processing unit, the error diffusion process to the density component whose highest density which can be expressed is high.

Claim 7 is directed to an image processing method and claim 10 is directed to a print control method, and both claims have identical features similar to the table listed

above. Claim 13 is direct to a computer-readable storage medium on which is stored an image processing program, and claim 16 is directed to a computer-readable storage medium on which is stored a print control program, and these claims have identical features similar to the table listed above.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18 and 25 to 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With respect to claim 1, limitations recite, "**an error diffusion processing control unit that controls to execute, by the first processing unit, the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component whose highest density which can be expressed is low, and executing, by the second processing unit, the error diffusion process to the density component whose highest density which can be expressed is high**", (emphasis added). The underlined phrases are confusing. For instance, does "the density component" is the same component having highest density executed by both first and second process unit? The feature of the limitation, "can be expressed is low" and "can be expressed high" is also confusing. For example, "can be expressed" implies that there is another operation or process. Is the operation or process to show, to display, to record or to print the result of error diffusion process? If so, what are the subject or element and value to be expressed? Is

value of density, error diffusion coefficient or threshold to be expressed as "low" or "high"? And what is the guideline used to determine "low" and "high"? Further, "can be expressed low" or "can be expressed high" will NOT carry any weights in the claim because it is not an essential step, function or process; it is just possible to be expressed "low" or "high".

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takano et al (US 6,643,031) (Takano' 031) in view of Cooper et al (US 6,356,363) (Cooper' 363) and further in view of Spaulding et al (US 7,064,869) (Spaulding' 869).

Regarding claim 1.

Tankano' 031 discloses an image processing apparatus (**Tankano' 031 discloses an image processing apparatus of Fig. 1, col 6, lines 21-26**) for executing an error diffusion process to a plurality of density components (**Tankano' 031 discloses error diffusion process to density components in Fig. 27, col 20, lines 55-62**), comprising:

a processor and a memory (**e.g. a halftone processor of Fig. 3, and detail of the processor is described in col 8, lines 1-8**);

a first processing unit (**e.g. Second Error Diffusion 6004 of Fig. 23, col 18, lines 24-30**) that executes the error diffusion process on the basis of information on one of the density components to be processed (**Tankano' 031 discloses number of embodiments teaching multiple halftoning and error diffusion functions, each process is based on density components, e.g. comparing density with threshold value to determine which error diffusion process is used for error calculation and distribution, col 19, line 65 to col 20, line 40**);

a second processing unit (**e.g. First Error Diffusion 6003 of Fig. 23, col 18, lines 24-30**) that executes the error diffusion process by setting, into fixed values, the quantization threshold value and the quantization diffusion coefficient (**e.g. predetermined threshold value, col 20, lines 25-40**) which are used for the error diffusion process, wherein the error diffusion process by the second processing unit requires a lighter processing load (**e.g. "In the first error diffusing means 6003, the quantization number is large, so fine non-image portions appear, and the distribution of these non-image portions has a short period" indicating that the process requires a lighter processing load, col 19, lines 46-50**) than the error diffusion process by the first processing unit (**Tankano' 031 discloses that the First Error Diffusion means 6003 takes shorter time than the Second Error Diffusion, thus the First Error Diffusion Means 6003 requires lighter process load than the Second Error Diffusion means 6004, col 19, lines 46-57**); and

an error diffusion processing control unit (**e.g. Halftone Processing Processor 135 includes Halftone Processing Selecting means 6006 of Fig. 23**) that controls to execute, by the first processing unit, and executing, by the second processing unit (**Tankano' 031 discloses a halftone processing processor to control error diffusion process by comparing threshold values to determine which error diffusion processing means to process the input image based on density component, Fig. 23, col 18, lines 24-42 and col 20, lines 16-40**).

Tankano' 031 does not explicitly disclose changing at least one of a quantization threshold value and a quantization diffusion coefficient which are used for the error diffusion process; the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component whose highest density which can be expressed is low; the error diffusion process to the density component whose highest density which can be expressed is high.

Cooper' 363 teaches changing at least one of a quantization threshold value and a quantization diffusion coefficient which are used for the error diffusion process (**Cooper' 363 discloses a threshold generating and updating process for each color plane for dithering process, Fig. 28A and col 35, lines 52-64 and col 37, lines 33-40**); and

Spaulding' 869 teaches the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component (**Spaulding' 869 discloses multi-channel color**

halftone processes where density of same or similar colors have different density are processed in Figs. 6, 7 and 9, col 5, line 52-60, col 13, lines 58-67).

Having an image processing apparatus of Takano' 031 reference and then given the well-established teaching of Cooper' 363 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the image processing apparatus of Takano' 031 reference to include changing at least one of a quantization threshold value and a quantization diffusion coefficient which are used for the error diffusion process as taught by Cooper' 363 reference since doing so would improve image process quality by adjusting threshold values in all tone level and further the technique provided could easily be established for one another with predictable results; and then to modify the combination of Takano' 031 and Cooper' 363 to include the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component as taught by Spaulding' 869 since doing so would improve error diffusion process efficiency by processing density component one color channel a time, and further the process provided could easily be established for one another with predictable results.

Regarding claim 4.

Claim 4 is directed to a printer control apparatus claim which substantially corresponds to the operation of the device in claim 1 with identical features directly corresponding to the function of device elements in claim 1. Thus claim 4 is rejected as set forth above for claim 1.

Regarding claim 7.

Claim 7 is directed to an image process method claim which substantially corresponds to operation of the device in claim 1 with method steps directly corresponding to the function of device elements in claim 1. Thus, claim 7 is rejected as set forth above for claim 1.

Regarding claim 13.

Claim 13 is directed to a computer-readable storage medium claim which substantially corresponds to operation of the device in claim 1 with processing steps directly corresponding to the function of device elements in claim 1. Thus, claim 13 is rejected as set forth above for claim 1.

Regarding claim 10.

Claim 10 is directed to a printer control process method claim which substantially corresponds to operation of the device in claim 4 with method steps directly corresponding to the function of device elements in claim 4. Thus, claim 10 is rejected as set forth above for claim 4.

Regarding claim 16.

Claim 16 is directed to a computer-readable storage medium claim which substantially corresponds to operation of the device in claim 4 with processing steps directly corresponding to the function of device elements in claim 4. Thus, claim 16 is rejected as set forth above for claim 4.

Regarding claim 3.

Tankano' 031 discloses wherein said first processing unit is an error diffusion process for executing quantization on the basis of information of the other density components among said plurality of density components (Tankano' 031 discloses multiple error diffusion processing units each quantization process is based on a plurality density components including other density components, Figs. 20, 23 and 2, and col 20, lines 16-40).

Regarding claim 6.

Claim 6 recites identical features of claim 3. Thus claim 6 is rejected for the same reason discussed in the rejection of claim 3.

Regarding claim 9.

Claim 9 recites identical features of claim 3. Thus claim 9 is rejected for the same reason discussed in the rejection of claim 3.

Regarding claim 12.

Claim 12 recites identical features of claim 3. Thus claim 12 is rejected for the same reason discussed in the rejection of claim 3.

Regarding claim 15.

Claim 15 recites identical features of claim 3. Thus claim 15 is rejected for the same reason discussed in the rejection of claim 3.

Regarding claim 18.

Claim 18 recites identical features of claim 3. Thus claim 18 is rejected for the same reason discussed in the rejection of claim 3.

9. Claims 25, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takano et al (US 6,643,031) (Takano' 031) in view of in view of Spaulding et al (US 7,064,869) (Spaulding' 869) and further in view of Kakutani (US 6,943,918).

Regarding claim 25.

Tankano' 031 discloses an image processing apparatus (**Tankano' 031 discloses an image processing apparatus of Fig. 1, col 6, lines 21-26**) for executing an error diffusion process to a plurality of density components (**Tankano' 031 discloses error diffusion process to density components in Fig. 27, col 20, lines 55-62**), comprising:

a processor and a memory (**e.g. a halftone processor of Fig. 3, and detail of the processor is described in col 8, lines 1-8**);

a first processing unit (**e.g. Second Error Diffusion 6004 of Fig. 23, col 18, lines 24-30**) that executes the error diffusion process by changing at least one of a quantization threshold value and a quantization diffusion coefficient which are used for the error diffusion process on the basis of information on one of the density components to be processed (**Tankano' 031 discloses number of embodiments teaching multiple halftoning and error diffusion functions, each process is based on density components, e.g. comparing density with threshold value to determine which error diffusion process is used for error calculation and distribution, col 19, line 65 to col 20, line 40**);

a second processing unit (**e.g. First Error Diffusion 6003 of Fig. 23, col 18, lines 24-30**) that executes the error diffusion process by setting, into fixed values, the

quantization threshold value and the quantization diffusion coefficient (**e.g. predetermined threshold value, col 20, lines 25-40**) which are used for the error diffusion process, wherein the error diffusion process by the second processing unit requires a lighter processing load (**e.g. "In the first error diffusing means 6003, the quantization number is large, so fine non-image portions appear, and the distribution of these non-image portions has a short period" indicating that the process requires a lighter processing load, col 19, lines 46-50**) than the error diffusion process by the first processing unit (**Tankano' 031 discloses that the First Error Diffusion means 6003 takes shorter time than the Second Error Diffusion, thus the First Error Diffusion Means 6003 requires lighter process load than the Second Error Diffusion means 6004, col 19, lines 46-57**); and

an error diffusion processing control unit (**e.g. Halftone Processing Processor 135 includes Halftone Processing Selecting means 6006 of Fig. 23**) that controls to execute, by the first processing unit, and executing, by the second processing unit (**Tankano' 031 discloses a halftone processing processor to control error diffusion process by comparing threshold values to determine which error diffusion processing means to process the input image based on density component, Fig. 23, col 18, lines 24-42 and col 20, lines 16-40**).

Tankano' 031 does not explicitly disclose the error diffusion process of the density components of a similar color among the plurality of density components; the error diffusion process to the density component whose droplet is small; the error diffusion process to the density component whose droplet is large.

Spaulding' 869 teaches the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component (**Spaulding' 869 discloses multi-channel color halftone processes where density of same or similar colors have different density are processed in Figs. 6, 7 and 9, col 5, line 52-60, col 13, lines 58-67**); and

Kakutani' 918 teaches the error diffusion process to the density component whose droplet is small (**Kakutani' 918 discloses error diffusion process for small and large dot size based on density component, in Fig. 12, and col 12, line 19 to col 13, line 10**); the error diffusion process to the density component whose droplet is large (**Kakutani' 918 discloses error diffusion process for small and large dot size based on density component, in Fig. 12, and col 12, line 19 to col 13, line 10**).

Having an image processing apparatus of Takano' 031 reference and then given the well-established teaching of Spaulding' 869 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the image processing apparatus of Takano' 031 reference to include the error diffusion process to density components of a similar color among the plurality of density components by executing the error diffusion process to the density component as taught by Spaulding' 869 since doing so would improve error diffusion process efficiency by processing density component one color channel a time, and further the process provided could easily be established for one another with predictable results; then to modify the combination of Takano' 031 and Spaulding' 869 to include the error diffusion process to the density component whose droplet is small; the error diffusion

process to the density component whose droplet is large as taught by Kakutani' 918 since doing so would improve image quality by error diffusion processing large droplet or large dot, and small droplet or small dot since the expression of large dot and small dot have different visual effect, and further the technique provided could easily be established for one another with predictable results.

Regarding claim 26.

Claim 26 is directed to an image process method claim which substantially corresponds to operation of the device in claim 15 with method steps directly corresponding to the function of device elements in claim 25. Thus, claim26 is rejected as set forth above for claim 25.

Regarding claim 27.

Claim 27 is directed to a computer-readable storage medium claim which substantially corresponds to operation of the device in claim 25 with processing steps directly corresponding to the function of device elements in claim 25. Thus, claim 27 is rejected as set forth above for claim 25.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Kau whose telephone number is 571-270-1120 and fax number is 571-270-2120. The examiner can normally be reached on M-F, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Steven Kau/
Examiner, Art Unit 2625
10/31/2008

/David K Moore/
Supervisory Patent Examiner, Art Unit 2625